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**TECHNICAL  
ASSISTANCE  
TO THE  
AUTOMOBILE  
REPAIR  
WORKSHOP  
DEPARTMENT,**

DP/BHU/72/005

**BHUTAN,**

TERMINAL REPORT

176

Prepared for the Government of Bhutan by the  
United Nations Industrial Development Organization,  
executing agency for the  
United Nations Development Programme



**United Nations Industrial Development Organization**

United Nations Development Programme

TECHNICAL ASSISTANCE TO THE AUTOMOBILE REPAIR

WORKSHOP DEPARTMENT

DP/BHU/72/005

BHUTAN

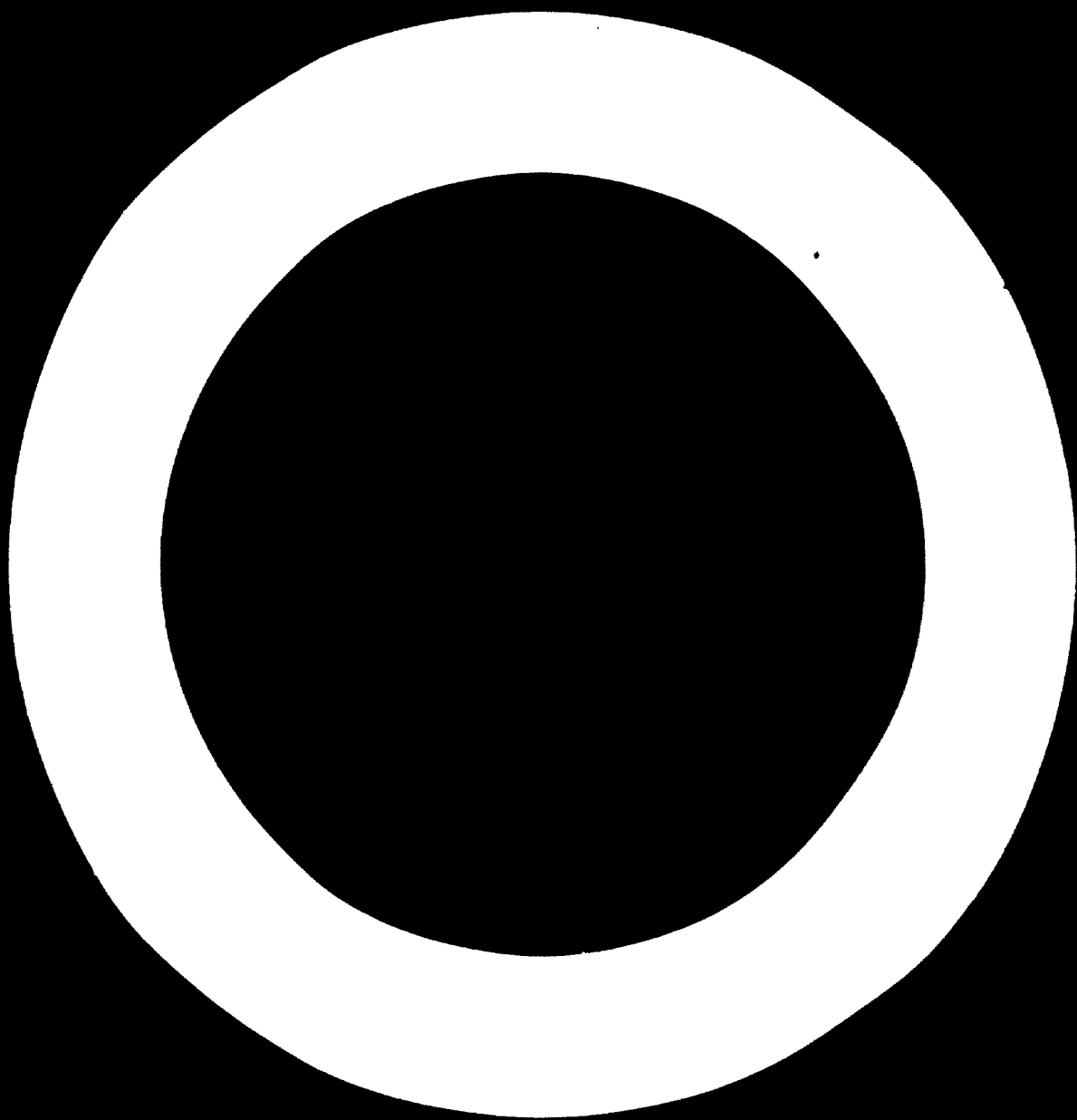
Project findings and recommendations

Prepared for the Government of Bhutan  
by the United Nations Industrial Development Organization,  
executing agency for the United Nations Development Programme

Based on the work of E. L. Bauer, project manager

United Nations Industrial Development Organization

Vienna, 1976



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Explanatory notes

A comma (,) is used to distinguish thousands.

References to dollars (\$) are to United States dollars.

The use of a hyphen between dates representing years signifies the full period involved, including the beginning and end months or years, e.g. 1961-1965.

The following abbreviations are used in this report:

BGTS      Bhutan Government Transport Service

GWD        Government Workshop Department

PWD        Public Works Department

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SUMMARY

The project "Technical Assistance to the Automotive Repair Workshop Department" (DP/BHU/72/005) in Bhutan of the United Nations Development Programme (UNDP) became operative in 1973. The United Nations Industrial Development Organization (UNIDO) was designated as the executing agency. As of June 1975, UNDP had allocated a total of \$397,650, including the costs of 30 man-months of expertise, 12 fellowships for a total of 66 man-months and \$249,000 for machinery and equipment, about half of which has already been installed in four existing workshops; work on two others is under way. Two experts, one in automotive diesel and electrical systems, the other an automotive workshop co-ordinator were recruited.

Major activities completed by the project included reorganization of the management of two existing workshops; centralization and rationalization of spare parts stores and their procedures; organization of the training of automotive mechanics; specification, procurement and installation of equipment for automotive workshops; division of responsibilities between the Government Workshops and other agencies; organization and implementation of preventive maintenance; preparation of layouts for new workshops; and recruitment and training of skilled personnel.

The project was designed primarily to satisfy the minimum requirements of Bhutan for the maintenance and repair of automotive vehicles. It was soon found that further inputs were urgently required, and a new project, "Accelerated Programme for the Establishment and Development of Government Workshops" (DP/BHU/75/003) was conceived to improve the existing workshops; to establish small new ones in northern Bhutan; to prepare and implement in-plant training programmes; and to organize and implement internationally financed fellowship programmes for higher maintenance and management staff of the Government Workshops Department and a nationally financed fellowship programme for lower-level staff, to be carried out with the assistance of automotive and ancillary equipment in India.

Among the measures taken by the Government to overcome the lack of trained personnel has been the creation of better educational opportunities for young Bhutanese, such as providing fellowships for study abroad and upgrading skills within the country. Sources of recruitment of trained personnel have been surveyed, and a two-phase training programme at the Don Bosco Technical School has been arranged.

The mid-term review mission has recommended a project for UNDP assistance in organizing a system for the acquisition and distribution of spare parts that would be more efficient and economic than the present one.



## INTRODUCTION

### Project background

Bhutan is a land-locked, least-developed country situated in the eastern Himalayas between China and India. Its economic development began only a decade and a half ago from a base of isolated, self-sufficient homesteading peasants with no modern means of communication and very little education.

During its first two five-year plans (1961-1965 and 1966-1970), the highest priority was given to development of infrastructural facilities, particularly roads. As a result, Bhutan has today about 1,500 km of all-weather roads and about the same length of feeder roads. The immediate impact of road development was the introduction of vehicular traffic, since there was no possibility of developing any other means of surface transportation in so mountainous a country. Automobiles, buses and trucks can provide the only satisfactory means of transportation in Bhutan. The number of such automotive vehicles is continuously increasing, from 831 in 1973 to 1,114 in 1975. Of these, 773 belong to various government departments, the remaining 341 being privately owned.

Along with road building, many other activities are being undertaken continuously to develop forestry, agriculture, power and industry for which various kinds of automotive, earth-moving and industrial equipment such as bulldozers, tractors, road-rollers and compressors are being procured in increasing numbers by the Government. There were about 150 such units in 1973, distributed over the entire country.

Together with the growth of vehicular traffic and other development activities, a beginning was made to establish automotive service, maintenance and repair facilities. Workshops were set up, financed and managed by the Government, in Phuntsholing and Thimphu. However, these workshops were not well equipped and could not handle many kinds of repairs to automotive equipment. Furthermore, both of these workshops were located in western Bhutan, but with the extension of the road network to central and eastern Bhutan and the steady increase of vehicular traffic there, the need was felt to establish two more workshops at Gaylephug and Samdrup Jonkhar.

### Official arrangements

The project was approved by UNDP in August 1973 with UNIDO as the executing agency and the Ministry of Finance of the Government of Bhutan as the government co-operating agency. The project document was submitted by the Government on 22 May 1973 and signed on behalf of UNIDO and UNDP on 28 September 1973, when the project was officially declared operational.

According to the latest project revision approved on 6 June 1975, the UNDP contribution to the project was raised to \$397,650, which includes provision for 30 man-months of expertise, 12 fellowships for 66 man-months and equipment worth \$249,000. The starting date of this four-year project was set for 1 January 1974. The UNIDO co-ordinator, E. L. Bauer, arrived in Thimphu in that month (annex I).

As scheduled in the project work plan, a mid-term review of the project was organized in March/April 1975 to evaluate the progress of the project and to make recommendations for additional assistance for which the Royal Government had submitted an official request in August 1974. The review mission concluded that the inputs for the project, as provided in the project document and its revision, could be delivered by the end of 1975, and that there was thus no point in extending activities of the present project beyond that date. However, it recommended additional assistance to the Government Workshops under a new project entitled 'Accelerated Programme for the Establishment and Development of Government Workshops' (DP/BHU/75/003), to begin on 1 January 1976. The duration of the present project was consequently reduced to two years.

### Objectives of the project

The project was initiated to provide adequate repair, maintenance and servicing facilities for automotive vehicles owned by various government departments as well as by the private persons who travel in the western and southern parts of the central and eastern regions of Bhutan.

The immediate objective of this project was to strengthen and expand the two existing workshops at Phuntsholing and Thimphu by utilizing more effectively the existing machinery, equipment and manpower and by specifying and installing the additional equipment required, and to set up two additional workshops with modern equipment and tools in central and eastern Bhutan. Simultaneously, it was considered essential to formulate and implement preventive maintenance programmes for all the government vehicles and to develop suitable training programmes for local mechanics to replace progressively the aliens now working in the existing workshops and to provide a regular source of trained manpower for future government workshops. The project also aimed at identifying in specific terms the responsibilities of the government workshops vis-à-vis those run by the Bhutan Government Transport Service (BGTS) and the Public Works Department (PWD).

As a result of the mid-term review of the project, a project revision was approved by UNDP on 6 June 1975 that provided the project with additional UNDP inputs of \$57,650 for six additional man-months of consultancy in diesel and electrical systems and mechanical engineering, an additional fellowship for six months for an automobile mechanic and, to prevent pollution of river water, oil/gasoline separators for four workshops and a washing hall built in Thimphu.

## I. FINDINGS

By the end of December 1975 the project had received about half of the equipment that was to have been provided; it has been installed in the four existing workshops. There have been serious delays in the delivery of equipment, particularly the recovery van and some electrical and mechanical items. These delays are attributable, primarily, to the economic recession in Europe and to the long closure of the Suez Canal. Consequently, work on the two new workshops at Gaylephug and Samdrub Jonkhar has been started only recently. It is expected, however, that the remaining equipment will be delivered and installed within the first quarter of 1976.

Two experts have been recruited (annex I). An expert on diesel and electrical systems started work in December 1975, and an automotive workshop coordinator was expected to arrive and begin work in January 1976. Since both of these projects are included in the new project Accelerated Programme for the Development and Establishment of Government Workshops, which is to be a continuation of the present project, these experts should be able to clear up the backlog of work in the present project along with their activities in the new one.

All of the twelve fellowships have been awarded (annex II). However, there have been considerable difficulties and delays in arranging suitable placements. By the end of December 1975, two fellows had completed their training, five were already receiving training abroad, and placement for the remaining five has been arranged.

The major activities completed by the project are the following:

(a) Reorganization of the management of the existing workshops at Phuntsholing and Thimphu to ensure better control and to simplify accounting procedures;

(b) Centralization of the two spare parts stores (at Phuntsholing and Thimphu) for better inventory control, and modernization of purchasing methods and distribution with the aid of a card-file system;

(c) Organization of training programmes for mechanics with automobile and ancillary equipment manufacturers in India. Thus far, 16 mechanics have been trained, and 16 others will be sent for the same type of training during 1976;

(d) Specification, procurement and installation of the equipment for the two existing workshops at Phuntsholing and Thimphu and two new workshops at Samdrup Jonkhar and Gaylephug;

(e) Establishment by the Government of Bhutan of a clear separation between the repair activities to be undertaken by the government workshops and those to be handled by other governmental organs such as BGTS, PWD and the Ministry of Agriculture. The Government workshops now take care of all major repairs, not only of automotive vehicles but also of heavy earth-moving machinery, agricultural machinery, stationary engines and the like. The workshops of other governmental agencies are now restricted primarily to the servicing, preventive maintenance and minor repairs of their own fleets of automotive vehicles and similar equipment;

(f) Formulation and implementation of preventive maintenance programmes for all the BGTS vehicles with a view to increasing their life-spans and those of their components by preparing modern control charts for lubrication and preventive maintenance and by keeping proper log-books and service records;

(g) Preparation of detailed layouts for the new workshops at Samdrup Jongkhar and Gaylephug. Their construction has been completed;

(h) Recruitment of skilled technical personnel for the workshops has been done with the help of the Manpower Section, Ministry of Development, Government of Bhutan;

(i) Preparation of detailed layouts and plans for the extension of the workshop and the public washing hall at Thimphu were prepared and approved by the Government. Construction work is now under way and is to be completed by March 1976;

(j) Installation of the equipment at the four workshops as it began to arrive at the project sites in June 1975.

The present status of the existing repair, maintenance and service facilities in Bhutan are described below. It can be seen that a clear-cut division of labour among the automotive workshops has been established.

### Thimphu

The three workshops in Thimphu belong to the Government Workshop Department, (GWD), BGTS and PWD. The GWD unit handles all types of repairs to automotive, heavy-duty and industrial equipment, while under BGTS and PWD have garage facilities and undertake only minor repairs and the servicing of their own fleets of vehicles. The GWD unit should be further strengthened by the installation of additional equipment and the replacement of old equipment.

### Phuntsholing

Phuntsholing is a border town in western Bhutan. It has two workshops, one under GWD, the other under BGTS. The BGTS workshop has facilities for garage, servicing, body building and minor repairs, while the government workshop should be further strengthened to make it able to undertake all type of repairs to automotive and industrial equipment.

### Gaylephug

There are two workshops in Gaylephug, which is in the southern part of central Bhutan, one under BGTS with garages and servicing facilities, the other, under GWD, which has been set up under this project to handle minor repairs. Under the new project this latter workshop is to be developed to handle all kinds of repairs except major ones such as crankshaft grinding, cylinder boring and chassis and body straightening.

### Samdrup Jongkhar

Samdrup Jongkhar is in eastern Bhutan. There are two workshops there, one under GWD, the other under BGTS. The distribution of work between these workshops is the same as between those in Gaylephug.

### Sarbhong

Sarbhong is in central Bhutan. The PWD unit there undertakes minor repairs and the servicing of road machinery.

This project was primarily designed to meet the bare minimum of the country's requirements for automotive vehicle maintenance and repair. During the course of this project it was found that further inputs were urgently

required, and a new project was conceived to expand the activities of the present workshops as well as to make them available in areas not covered by this project. The new project is concerned with the following objectives:

(a) Improving the existing four workshops by simplifying repair procedures, increasing efficiency and supplying and operating the needed additional equipment;

(b) Establishing small repair centres in northern Bhutan (in Wangdiphodrang, Mongar, Bumthang, Tongsa and Tashigang). This region presently lacks any repair facilities but is densely populated, and many automotive vehicles and similar machine operate there;

(c) Preparing and carrying out in-plant training programmes in management and specific technical fields for the benefit of diploma holders of the Don Bosco Technical School and other existing Bhutanese staff with the government workshop;

(d) Specifying and implementing an international fellowship programme for higher managerial and technical staff of the government workshop.

(e) Specifying and implementing fellowship programmes for lower-level staff to be carried out with the help of automotive and ancillary manufacturers in India, these are to be financed directly by the Government of Bhutan.

One of the major problems experienced by the government workshops is the lack of appropriate systems for ensuring the ready availability of spare parts. Most of the automotive vehicles in Bhutan were built in India. In view of the scarcity of funds to purchase spare parts in bulk from the manufacturers in that country, they are procured in small quantities and at high premiums over the recommended retail prices after extensive search among the sub-dealers and spare-parts shops in Indian border towns. This procedure causes considerable delays in repairs and involves added expense in practically all repairs that involve the replacement of parts. In the case of imported vehicles or equipment, the Government is unable to procure spare parts, since it lacks the necessary foreign exchange.

The mid-term review mission therefore recommended a project for UNDP assistance to organize a speedy system of ordering, procurement (in bulk, whenever possible) and supply, through the establishment of a Central Store in Phuntsholing under the CMO of the Ministry of Finance. This project, when imple-

mented, as well as the proposed project Accelerated Programme for the Establishment and Development of Government Workshops, will constitute a great step forward in ensuring an efficient and regular repair and maintenance facility throughout the country for all kinds of equipment required for present and future development activities in Bhutan.

Another problem is the mountainous nature of the country, which considerably reduces the effective lives of vehicles; it is estimated that the life-span of vehicles in Bhutan is only 25% of what it is in more level countries. The present road system is, to a large extent, responsible for considerable depreciation of automotive vehicles. The distances could be considerably reduced and the winding nature of the roads could be rectified by the construction of bridges and tunnels. No doubt such a scheme of road construction and improvement would involve huge investment, but considering the immense benefits that would accrue to the economy of Bhutan, not only in extending the life-spans of the vehicles, but in savings of time and money for transporting people, goods and materials to distant places within the country, as well as beyond its frontiers, it is evident that such an investment would be highly desirable. The present road system in Bhutan constitutes a serious obstacle to any efforts towards developing export industries, because transport costs are very high and the time taken to transport goods is very long.

Since Bhutan began its socio-economic development only very recently, there is insufficient electrical power throughout the country, although it has great potential for hydroelectric power development. Bhutan receives its electrical power either from India or from very small hydroelectric projects set up in the interior. Consequently, the power supply is irregular; voltage fluctuates between 120 and 260 volts. This situation has caused the burning out of electric motors and other equipment in the workshops and elsewhere. It is thus necessary to install voltage stabilizers with automatic cut-off devices in the four main repair workshops at Thimphu, Phuntsholing, Gaylephug and Samdrup Jongkhar in order to prevent damage to the equipment.

The lack of educated, skilled manpower is one of the greatest handicaps faced by Bhutan in carrying out its development schemes. The various measures taken by the Government to create better educational facilities for young Bhutanese include providing fellowships abroad, particularly in India, and upgrading vocational training in the country so as to provide expertise in special fields for the



training of local personnel. To meet the manpower requirements of the government workshops, the project has surveyed the sources of recruitment of skilled personnel and has arranged a specific programme for training them at the Don Bosco Technical School, which also receives assistance from UNDP. The training programme comprises two phases: Phase I, which is of two-year duration and deals with the basic theory and fundamentals of the automobile and other equipment repair trade, while the phase II will be concerned more with practical in-plant training at the GWD workshops in Thimphu and Phuntsholing.

These workshops now lack personnel adequately trained in diesel-electric systems. An expert has been recruited to remedy this situation (annex I). He is to remain with the workshops for two years, under the new project. With his help and instruction, the workshops should become able to perform effective service in this area.

## II. RECOMMENDATIONS

UNDP assistance in establishing a Central Store for Spare Parts at Phuntsholing should be approved as soon as possible to enable the workshops acquire their requirements of spare parts with minimum delay and at standard prices. An amount of \$250,000 has been provided under this project for procurement of spare parts. The replenishment of spare parts of Indian origin could be arranged from the proceeds of their sales to government departments of private individuals, but the Government should also reserve some funds in foreign exchange for replenishing the stock of spare parts from time to time.

Since it is difficult to arrange for adequate quantities of spare parts for all types of vehicles and equipment with the limited funds to be made available by UNDP, it is essential that the Government standardize the procurement of vehicles and equipment in Bhutan so that better utilization will be made of all kinds of spare parts for the standardized vehicles and equipment.

There has been considerable delay in the procurement of certain equipment for the government workshops. In particular, there was a long delivery period for a vehicle-recovery van. Such a vehicle could have been assembled in one of the government workshops from components (a diesel truck and a winch hoist) available in India. It is thus recommended that the government workshop undertake any such work with which they can cope. For instance, the workshop in Phuntsholing could be assigned, and paid to perform, the task of assembling the recovery van that is to be provided under the new project. This would be both quicker and less costly than importing another such complete vehicle.

It is recommended that the senior officials of GWD be sent on short study tours abroad to various transport departments to put them in touch with the latest developments in management practices. Such study tours would be most useful in promoting efficient management of the government workshops.

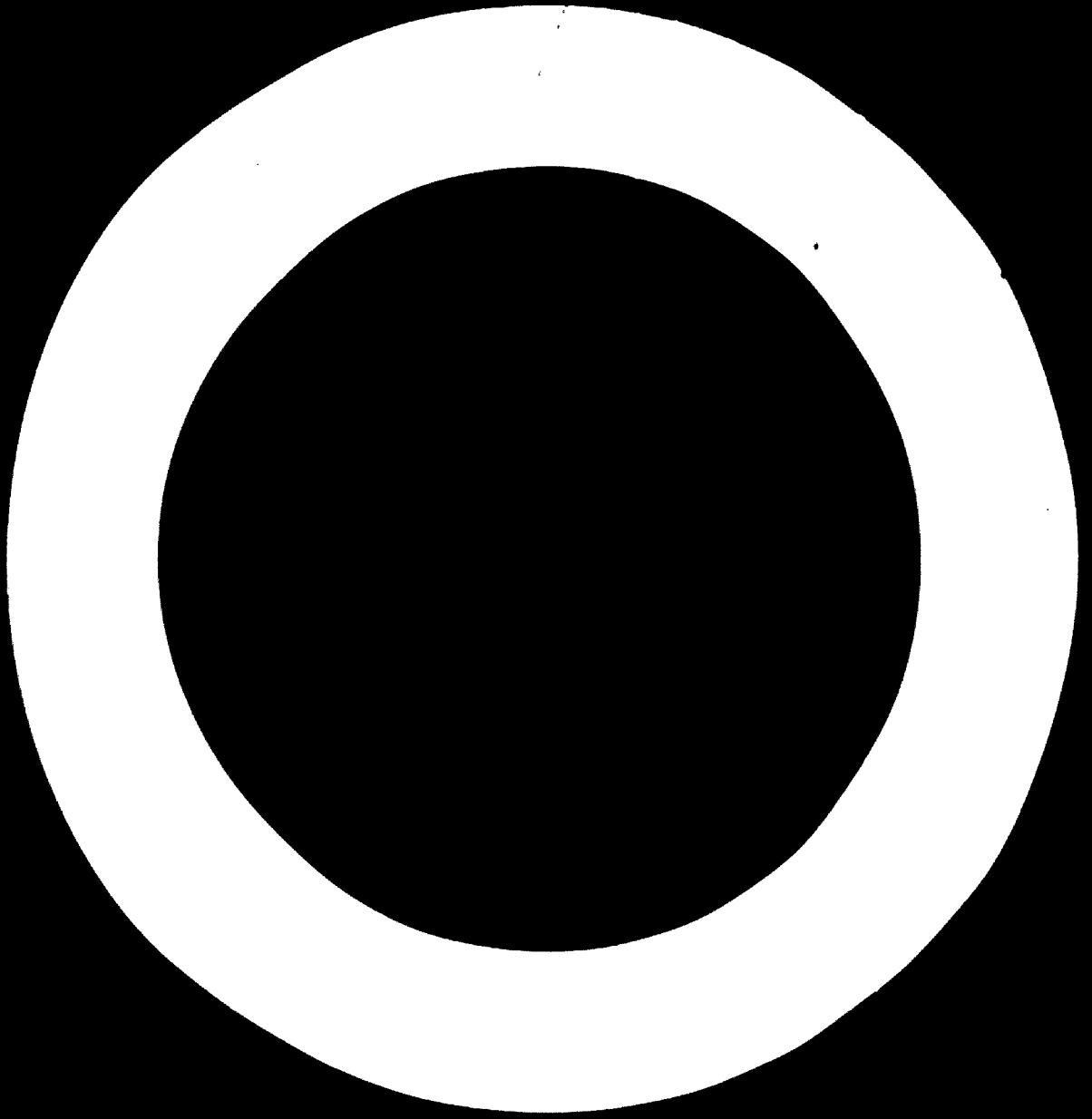
Since there is great demand for trained personnel in Bhutan, it is feared that the trainees may join other organizations after completing the two-year training course organized by the project at the Don Bosco School at Phuntsholing. It is recommended that a certain number of trainees be exclusively reserved for the government workshops, and that their recruitment be negotiated before they complete their training at the Don Bosco School. New students at the school for

the two-year training programme should be boys not less than 14 years of age who have at least completed their elementary education, so that, upon completion of their training, they would be capable of performing significant amounts of practical repair work in the government workshops.

In view of the decision of UNDP to give responsibility for transporting UNDP equipment from Calcutta to the project sites in Bhutan to BGTS, it is recommended that UNDP finance the cost of two low-loading semi-trailers and two normal trailers with chassis that carry heavy equipment such as bulldozers for long distance with minimum damage.

This equipment has been included in project DP/BHU/75/003, and has been officially requested by the Government and is to be supplied directly by UNDP.

The above recommendations have been made after discussions with the authorities concerned in the Government and agreed to by them.



Annex I

INTERNATIONAL EXPERTS AND SENIOR COUNTERPART

International experts

Dates of service

E. L. Bauer  
Project Manager

15 January 1974 to 15 January 1976

I. Miller  
Expert in Diesel and Electric Systems

1 December 1975 to 25 February 1976

F. Schroeder  
Automotive Workshop Co-ordinator

Arrival awaited

Senior counterpart

Y. T. Lepcha  
Technical Co-ordinator

1 January 1974 to date

Annex II

FELLOWSHIPS AWARDED

The project supplied twelve fellowships for study abroad. By the end of 1975, two of these fellowships had been completed:

P. T. Karonga

|                                 |   |
|---------------------------------|---|
| Purpose of training:            | Maintenance, service and repair of heavy earth-moving machinery |
| Place of study:                 | United States of America  |
| Starting and termination dates: | 1 February to 31 July 1975                                      |

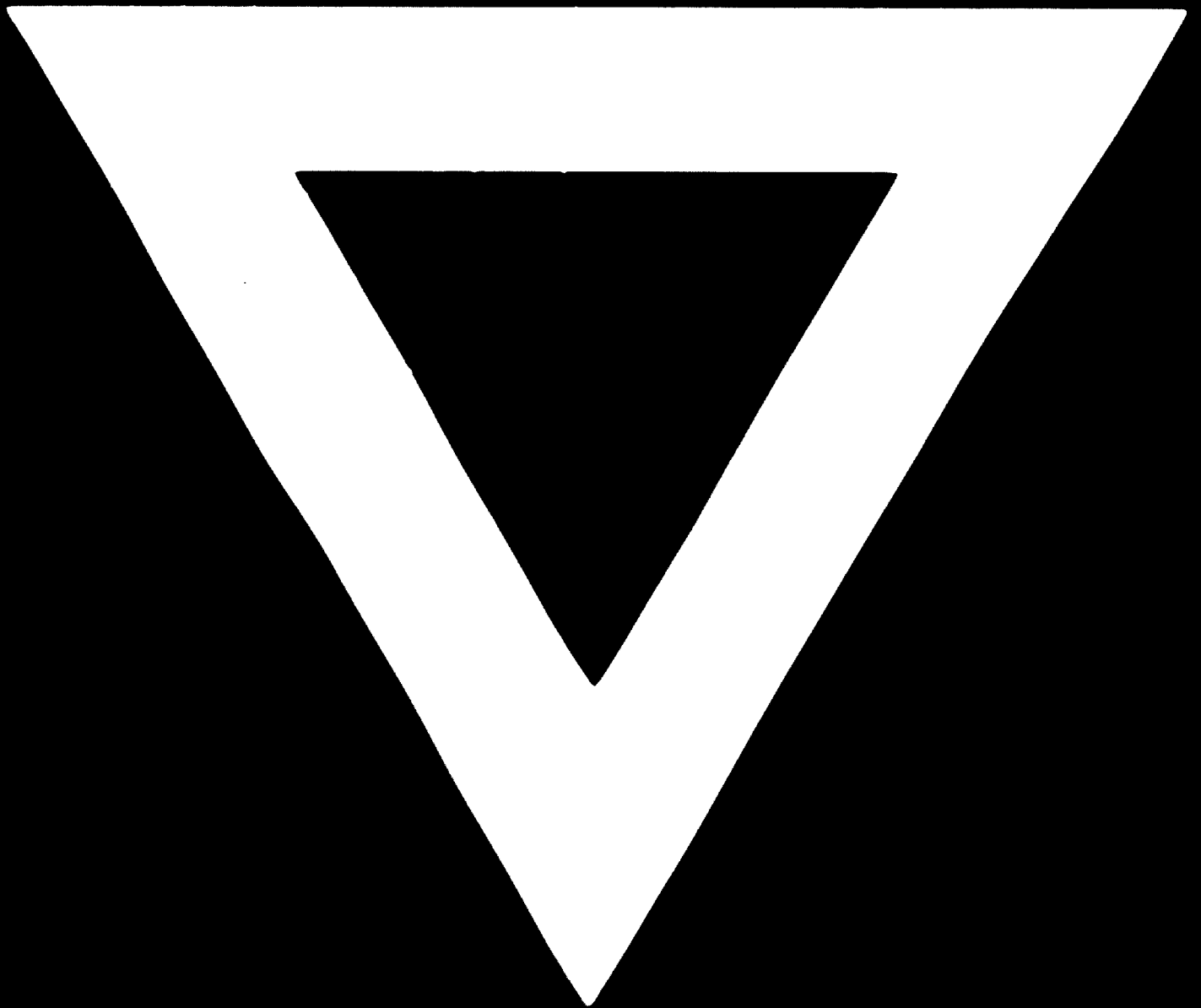
Karma Wangchuk

|                                 |  |
|---------------------------------|--|
| Purpose of training:            | General repair and maintenance of auto-mobiles (Mercedes, Volkswagen, Volvo) |
| Places of study:                | Federal Republic of Germany, Sweden  |
| Starting and termination dates: | 28 May to 31 November 1975   |

Five other fellows were still receiving training abroad, and placements for five more were being arranged.



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